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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,974	04/05/2001	Gong Gu	SAR 13995	4112

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EXAMINER

TRINH, SONNY

ART UNIT	PAPER NUMBER
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2685

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/826,974

Applicant(s)

GU ET AL.

Examiner

Sonny TRINH

Art Unit

2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-11 and 17-20 is/are allowed.
- 6) ☒ Claim(s) 12-14 is/are rejected.
- 7) ☒ Claim(s) 15 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement filed on 07/09/01, paper no. 04 has been considered and placed in the application file.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 12-13** are rejected under 35 U.S.C. 102(e) as being Bertonis et al. ("Bertonis"; U.S. Patent Number 6,625,222).

Regarding **claim 12**, with reference to figure 8 and description, Bertonis discloses an image-reject mixer comprising a first mixer (figure 8, mixer 90) having a first filter (93) and a local oscillator (LO) input (from VCO 84); a second mixer (91) having a second filter (94) and a LO input (from VCO); and commutating circuitry for commutating said LO inputs of said first mixer and said second mixer between in-phase

and quadrature phases (in phase and quadrature signal components are at filters 93-94, see columns 8-10, specifically lines 25 of column 9 to line 45 of column 10).

Regarding **claim 13**, Bertonis further teaches that said commutating circuitry generates two complementary 50% duty cycle clock signals for commutating said LO inputs of said first mixer and said second mixer between in-phase and quadrature phases (these are the sine and cosine of the desired center frequency, see column 9).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Bertonis et al. ("Bertonis"; U.S. Patent Number 6,625,222).

Regarding **claim 14**, Bertonis discloses the invention but does not explicitly disclose that said clock signals are waveforms selected from the group consisting of square waves and pseudo-random digital signals. However, there is a wide class of signal or function generators satisfying this condition, in practice the auxiliary mixing signal is a square wave with a fundamental wave whose frequency is constant or which is possibly modulated with a binary pseudo-random signal is well known and obviously can easily be realized by those skilled in the art and the Examiner takes Official notice

of such use. The motivation for using square wave is to use an off the shelf and readily available component to save development time.

***Allowable Subject Matter***

**4. Claims 1-11, 17-20 are allowed.**

The following is an examiner's statement of reasons for allowance:

The present invention relates to an image rejection mixer which includes first and second branches, each having first and second stage mixers for converting the frequency of a desired channel to an intermediate frequency (IF) and rejecting the image channel. The local oscillator (LO) ports of all the mixers are commutated between quadrature and in-phase LO signals, and the output of the branches are commutated between each other, by two complementary, 50% duty cycle clock signals. The commutating image-reject mixer exhibits improved immunity to amplitude and phase mismatches that may be present in each branch.

The closest prior art, Bertonis et al. (U.S. 6,625,222) shows an adaptive image reject mixer including the in phase and quadrature component signals which resulted by applying the sine and cosine of the desired downstream center frequency. However, Bertonis fails to disclose a "...a first mixing branch having a first plurality of mixers, each of said first plurality of mixers having a local oscillator (LO) input; a second mixing branch having a second plurality mixers, each of said second plurality of mixers having a LO input; a combiner for generating an intermediate frequency (IF)

signal from the outputs of said first and second mixing branches; and commutating circuitry for commutating said LO inputs of each of said first plurality of mixers and each of said second plurality of mixers between in-phase and quadrature phases, and for commutating the outputs of said first and second mixing branches between each other..."

This distinct feature has been added to independent claim 1 and renders it allowable.

**Claims 2-6** are allowed by virtue of their dependency on claim 1.

Regarding **claim 7**, Bertoni also fails to disclose "...an image-reject mixer comprising a first mixing branch having a first plurality of mixers; a second mixing branch having a second plurality mixers; a combiner for generating an intermediate frequency (IF) signal from the outputs of said first and second mixing branches; and commutating circuitry for commutating each of said first plurality of mixers and each of said second plurality of mixers between each other, and for commutating the outputs of said first and second branches between each other...".

**Claims 8-11** are allowed by virtue of their dependency on claim 7.

Regarding **claim 17**, the prior art of record also fails to disclose "...a method of rejecting an image signal comprising mixing a radio frequency (RF) signal with a first local oscillation (LO) signal to generate a first intermediate frequency (IF) signal; mixing said first IF signal with a second LO signal to generate a second IF signal; and commutating said first and second LO signals between in-phase and quadrature phases..." .

**Claims 18-20** are allowed by virtue of their dependency on claim 17.

5. **Claims 15-16** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding **claim 15**, the prior art provided numerous examples of image reject mixer, but failed to disclose or fairly suggest the specific combination of structural and functional limitations set forth in claim 15, specifically, wherein said commutating circuitry couples a LO signal that is commutated between in-phase and quadrature phases to said LO inputs of said first mixer and said second mixer.

## **Conclusion**

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

(703) 872-9306, (for formal communications intended for entry, for informal or draft communications, please label "PROPOSED" or "DRAFT")

*Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, 6<sup>th</sup> Floor (Receptionist).*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sonny TRINH whose telephone number is 703-305-

1961. The examiner can normally be reached on Monday-Thursday and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed URBAN can be reached on 703-305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**SONNY TRINH**  
**PRIMARY EXAMINER**

5/19/04